

TRANSMUTATION OF ^{238}Pu , ^{239}Pu , ^{237}Np , ^{241}Am , ^{129}I USING NEUTRONS PRODUCED IN TARGET-BLANKET SYSTEM “ENERGY & TRANSMUTATION” BOMBARDED BY RELATIVISTIC PROTONS

J Adam¹, A Balabekyan², A A. Solnyshkin³, V G. Kalinnikov³, K Katovsky⁴,
V I. Stegailov³, V M. Tsoupko-Sitnikov³, S G. Stetsenko³, M I. Krivopustov³,
V S. Pronskikh⁵, N M. Vladimirova³, H Kumawat⁶, W Westmeier⁷, R Odoj⁸

¹ *Joint Institute for Nuclear Research, Joint Institute for Nuclear Research, Dubna, 141 980 Russia; Institute for Nuclear Physics, The Academy of Science of the Czech Republic*

² *Joint Institute for Nuclear Research, Dubna, 141 980 Russia; Yerevan State University, Republic of Armenia*

³ *Joint Institute for Nuclear Research, Dubna, 141 980 Russia*

⁴ *Joint Institute for Nuclear Research, Dubna, 141 980 Russia; Dept. of Nuclear Reactors, Czech Technical University, Prague, 180 00 Czech Republic*

⁵ *Joint Institute for Nuclear Research, Dubna, 141 980 Russia; St. Petersburg State Institute of Technology, St. Petersburg, 198 013 Russia*

⁶ *Joint Institute for Nuclear Research, Dubna, 141 980 Russia; HENP Laboratory, Physics Department, University of Rajasthan, Jaipur, 302 004 India*

⁷ *Institute of Nuclear Chemistry, Philipps University, Marburg, Germany*

⁸ *Forschungszentrum Julich, Germany*

Target-blanket facility “Energy & Transmutation” was constructed in LHE JINR laboratory to study neutron spectra parameters and transmutation potential of subcritical reactor coupled with spallation neutron source. Blanket consists of natural uranium fuel rods with about 200kg amount of uranium. In the center of the blanket there is massive spallation target made from Pb. Target is irradiated by protons from the LHE Nuclotron accelerator with integral intensity approx. $1\text{E}14$ protons. The radioactive samples for transmutation studies are placed on the top of the blanket with a set of activation threshold detectors to determine neutron spectra. Reaction (transmutation, fission) rates of various isotopes produced in radioactive transuranium samples and ^{129}I , ^{127}I samples as well as threshold detectors (Au, Al, Cu, Ni, Co, Ta, In, Bi) analysis are determined using nuclear gamma-spectroscopy methods. HPGe detectors of LNP JINR perform gamma spectra measurements. Measurements of gamma spectra starts approximately two hours after irradiation and samples are measured more than week, so it is possible to find out isotopes with half-lives from about one hour to about a month. Gamma spectra are analyzed used standard spectroscopy methods included various kinds of corrections taken into account. Total number of protons is establishing from aluminum beam monitors, an estimation neutron spectrum is composing from threshold detectors results, and reaction rates (per one proton and per one target’s atom) of residual nuclei found are determined. Computation analyses will be performed, computed and experimentally determined spectra of neutron are compared. Fission products yields observed are compared with database data taken from various available nuclear data libraries and with older experimental data. Project “Energy & Transmutation” is supported by ISTC (project number 1372).